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ABSTRACT

To investigate how students' characteristics and experiences affect satisfaction, this study used regression and decision-tree analysis with the CHAID algorithm to analyze student opinion data from a sample of 1,783 college students. A data-mining approach identifies the specific aspects of students' university experience that most influence three measures of general satisfaction. The three measures have different predictors and cannot be used interchangeably. Findings show that academic experiences are influential. Faculty preparedness, in particular, which has a well-known relationship to student achievement, emerges as a principal determinant of satisfaction. Social integration and pre-enrollment opinions are also important. Campus services and facilities have limited effects, and students' demographic characteristics are not significant predictors. Decision-tree analysis reveals that social integration has more effect on the satisfaction of students who are less academically engaged. (Contains 7 tables and 29 references.) (Author/SLD)

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Student Satisfaction: Measures and Measurements

WHAT SATISFIES STUDENTS?

MINING STUDENT-OPINION DATA WITH REGRESSION AND DECISION-TREE ANALYSIS

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WHAT SATISFIES STUDENTS?
MINING STUDENT-OPINION DATA WITH REGRESSION AND DECISION-TREE ANALYSIS

Abstract

To investigate how students' characteristics and experiences affect satisfaction, this study uses regression and decision-tree analysis with the CHAID algorithm to analyze student-opinion data. A data-mining approach identifies the specific aspects of students' university experience that most influence three measures of general satisfaction. The three measures have different predictors and cannot be used interchangeably. Academic experiences are influential. In particular, faculty preparedness, which has a well-known relationship to student achievement, emerges as a principal determinant of satisfaction. Social integration and pre-enrollment opinions are also important. Campus services and facilities have limited effects, and students' demographic characteristics are not significant predictors. Decision-tree analysis reveals that social integration has more effect on the satisfaction of students who are less academically engaged.

In a results- and measurement-oriented environment, the policymakers who oversee higher education, the parents who pay for it, and the students who make college choices look for evidence of institutional quality to differentiate institutions and guide decisionmaking. This evidence includes objective outcome measures: Do students learn new facts or skills? Do they graduate? Are they subsequently successful in further education or careers? But subjective measures also indicate institutional quality: Do students have a rich and rewarding college experience? Do they believe they have learned and grown? Are they satisfied?

If students are viewed as consumers of higher education their satisfaction is important to institutional success, both because effective institutions should have satisfied customers and because satisfaction supports the recruitment of additional customers. Indeed Astin concludes that "it is difficult to argue that student satisfaction can be legitimately subordinated to any other education outcome" (Astin 1993, 273). Many colleges and universities use student satisfaction data to inform decision-making and assess institutional effectiveness (Beltyukova & Fox 2002), yet its determinants are not well understood because student satisfaction is a complex construct influenced by a variety of characteristics of students and institutions (Benjamin 1994, Sanders & Chan 1996). To better understand these influences and opportunities to increase student satisfaction, this study investigates alternative measures of students' general satisfaction using alternative measurement techniques: multiple regression and decision-tree analysis using CHAID.

Previous research on student satisfaction has focused on the characteristics of students and institutions that influence satisfaction (Astin 1993; Knox, Lindsay & Kolb 1992), identified the campus services with which students are more and less satisfied (Astin Korn & Green 1987), and examined how satisfaction is related to other outcomes such as academic achievement

(Aitken 1982, Bean & Bradley 1986, Knox *et al.* 1992, Pike 1991, Pike 1993) and retention (Aitken 1982; Hatcher, Kryter, Prus & Fitzgerald 1992). Student-development studies have also identified the effects on satisfaction of social factors such as peer relationships, student/faculty relationships, living arrangements, and students' self-evaluations (Bean & Bradley 1986, Benjamin & Hollings 1997, Endo & Harpel 1982, Hearn 1985, Pascarella 1980, Pike 1991, Terenzini & Pascarella 1980). This study contributes a new perspective to research on the complex relationships between satisfaction and students' characteristics and college experiences by investigating how a wide variety of specific perceptions and experiences influence students' general satisfaction.

The goal of identifying dimensions of student experience related to satisfaction provides an opportunity to explore the use of data mining in higher-education research because these techniques are designed to identify previously unrecognized patterns in large data sets, such as satisfaction patterns in student-opinion data. In business, data mining is used for tasks such as analyzing purchasing patterns to target sales campaigns and identify profitable customer types. It has been little used in higher-education research, but a market-segmentation study using the data-mining technique cluster analysis to identify student-satisfaction patterns demonstrates potential value (Borden 1995). This study extends the use of CHAID, one of the two cluster techniques tested by Borden, by exploring its use with a broader array of student satisfaction measures and comparing the results with regression analysis. While Borden identified the effects on satisfaction of demographic and college-status characteristics (such as class standing and academic unit), this analysis examines the relationship to general satisfaction of a broad array of student characteristics, experiences and perceptions. Decision-tree analysis and stepwise

regression are used as data-mining techniques to identify significant patterns in a many-variable data set, rather than testing specific hypotheses about the effects of preselected variables.

DATA

Data for this analysis are drawn from a student-opinion survey at a public research university in spring 2000 (ACT 2000). The survey was administered to students in a representative sample of undergraduate classes and either completed in class or distributed in class for completion prior to the next meeting. Enrollment in the sampled classes totaled 15% of undergraduate enrollment; 64% of the sampled students responded, yielding a sample of 1,783.

The survey collects data on a broad array of students' characteristics, experiences and plans; their satisfaction with campus environment, climate, services and facilities; their perceptions of growth, and the reasons for their college choice. For example, 44 variables measure satisfaction with characteristics of campus climate and environment, such as "your sense of belonging on this campus," "out-of-class availability of your instructors," and "racial harmony at this college. The 35 measures of satisfaction with campus services and facilities, include items such as "library facilities," and "college social activities."

SATISFACTION MEASURES

The student opinion survey includes four questions that indicate students' overall satisfaction with their college experience:

1. Indicate your level of satisfaction with this college in general.
2. If you could start college over would you choose to attend this college?
3. What is your overall impression of the quality of education at this college?
4. It is likely that I will transfer to another college before next fall.

It is important to understand whether survey items such as these measure the same thing and what they mean. Many surveys include only summary questions like the first two to assess student satisfaction, whereas this survey offers the opportunity to determine the specific elements of campus life that contribute most to these general ratings. Satisfaction with the quality of education offers an important comparison and highlights alternative consumer outcomes. To the extent that a college's mission is to provide education, its focus should be on ensuring customer satisfaction with education. Focusing on broader outcomes, such as students' general satisfaction, reflects the broader goal of providing a rewarding and pleasing environment. The likelihood of transfer offers a further perspective, on the assumption that dissatisfied students will "vote with their feet."

Three of the four satisfaction measures are moderately correlated, while the likelihood of transfer exhibits a weak correlation with satisfaction:

Table 1. Correlation of General Satisfaction Measures

	Would choose this college again	Satisfied with the quality of education	Likelihood of transfer*
Satisfied with this college in general	.588	.590	-.202
Would choose this college again		.532	-.277
Satisfied with the quality of education			-.190

* Correlation for freshmen, sophomores and juniors only.

To understand why students respond differently to these general satisfaction questions requires knowing what specific experiences their answers reflect. Identifying these experiences can also help faculty and staff set priorities for improving student satisfaction. Multiple regression provides one means of identifying the most important influences. Decision-tree analysis offers a richer account. Together the two types of analysis show that different indicators of general

satisfaction are influenced by a different array of student experiences, and different experiences affect the satisfaction of different types of students.

REGRESSION ANALYSIS

Multiple regression identifies a small number of specific elements that "explain" a large proportion of the variation in students' overall satisfaction. Table 2 summarizes the results of stepwise regressions including all variables significant at the .001 level, listing standardized beta coefficients to indicate the relative effect of the explanatory variables.

Table 2. Predictors of Students' General Satisfaction*

	Satisfied with the quality of education	Satisfied with this college in general	Would choose this college again
Academic Experience			
Academic experiences [in the classroom]**	.201	.157	.160
Quality of instruction	.218		
Intellectual growth*	.219		
Preparation for life-long learning*		.109	.138
Social Integration			
Sense of belonging on campus		.252	.215
Personal security/safety on campus		.131	
College social activities			.124
Racial and ethnic diversity of students		.130	
Campus Services and Facilities			
Classroom facilities		.126	
Library services		.077	
Access to computing services and facilities	.081		
Academic advising services	.089		
Attitude of staff (non-faculty) toward students	.095		
Pre-Enrollment Opinions++			
Accuracy of pre-enrollment information		.180	.129
First-, second-, third-choice college	.097		.188
Good faculty was reason for choosing this college		.078	
Career prep. was reason for choosing this college	.133		
PERCENT OF VARIATION EXPLAINED (R^2)	49%	58%	37%

* The numbers listed are standardized beta coefficients which show the relative effect of each independent variable by measuring the number of standard deviations the dependent variable would change for each standard deviation change in that independent variable, controlling for the effects of the other variables. Except as noted all questions are five-point scales ranging from "very dissatisfied" to "very satisfied."

** This important satisfaction indicator reads "How often have you been satisfied with your academic experiences at this college?" It appears in a section of the survey headed "Respond to the following questions about your classroom experiences at this college."

* Five-point scale ranging from "none" to "very large."

++ The rating item is first choice=4, second choice=3, third choice=2, or higher choice=1 . The reason items are three-point scales ranging from "not a reason" to "major reason."

Out of 172 survey items, just 17 appear in the multiple regression models; they are strong predictors, and the three general satisfaction measures have different predictors. The variables predicting satisfaction with the quality of education are especially distinct. None of the social integration measures appears as a predictor of satisfaction with the quality of education, whereas

"sense of belonging" is the most important predictor of both the more general satisfaction measures.

For each of the measures of general satisfaction, a variable related to students' pre-matriculation attitudes and experiences is the second most important predictor. "Likelihood of choosing this college again" is heavily influenced by whether it was the students' first, second, third or other choice. Satisfaction with "this college in general" is heavily influenced by students' recollection of the information they received before enrolling, perhaps an indicator of the extent to which their expectations were met. Several previous studies have analyzed the relationship of students' entering characteristics and satisfaction (Astin 1993, House 1999), but they did not flag the importance of these pre-college attitudes. The absence of demographic variables as predictors of satisfaction is consistent with other research (Knox *et al.* 1992).

The variables that predict likelihood of transfer are completely different from those that predict the three general satisfaction measures. The small number of students expecting to transfer impedes the development of a statistically acceptable model from the survey data, so none is included in Table 2. It appears, however, that the significant predictors of transfer relate to career goals and the absence of the specific academic programs students desire.

The different student experiences and perceptions summarized in alternative measures of overall satisfaction should be taken into account when these measures are used in outcomes assessment. General satisfaction is not the same as satisfaction with educational quality. The importance of pre-enrollment attitudes indicates that student satisfaction reflects inputs as well as college outcomes.

The specific satisfaction predictors identified in this analysis offer guidance to program development aimed at increasing student satisfaction though the generalizability of these results

is unknown. There is, however, no indication in these data that increasing student satisfaction will improve objective outcomes such as retention.

DECISION-TREE ANALYSIS USING CHAID

The data-mining technique of decision-tree analysis offers an alternative means of identifying specific elements of the college experience related to satisfaction. Multiple regression identifies influential variables as those most associated with the general satisfaction measures. The variables selected as predictors of student satisfaction are those that "explain" variance in the dependent variable. In contrast, decision-tree analysis identifies as the important elements of students' college experience those that most differentiate satisfied and dissatisfied students. The CHAID algorithm (chi-squared automatic interaction detector) used in this analysis finds those differences by using chi-squared tests to measure differences in the frequency distributions of the dependent variable with the independent variables.

The CHAID procedure begins by finding independent variables that have a significant association with the dependent or target variable. It then assesses the category groupings, or interval breaks in the case of continuous variables, to pick the most significant combination. Categories of the dependent variable are combined if they are homogeneous with respect to the independent variable. The independent variable having the strongest association with the target variable becomes the first node in a tree with a branch for each category that is significantly different relative to the outcome variable. The process is repeated to find the predictor variable on each branch most significantly related to the outcome variable, until no significant predictors remain. The specific technique used in this analysis is "exhaustive CHAID" in SPSS Answer Tree®. The subgroups or nodes of data are exhaustive in that they include every data point in the data set and exclusive because each data point belongs to only one node.

SATISFACTION WITH THE QUALITY OF EDUCATION

The experience that most distinguishes students who are satisfied with educational quality from those who are not is the perception of intellectual growth. Table 3 shows the frequency distribution that makes this variable the first node of the decision tree. The chi-square statistic of 418.46 for intellectual growth versus satisfaction is higher than for any other variable.

Table 3. Association of Satisfaction with the Quality of Education and Perceptions of Intellectual Growth

		Self-Reported Intellectual Growth (chi-square=418.46)			
	All students	Very large	Large	Moderate	Low/none
Percent rating the quality of education...					
Excellent	**.18**	**.46**	**.17**	**.06**	**.02**
Good	**.52**	**.45**	**.62**	**.50**	**.28**
Average	.23	.07	.18	.35	.35
Below average	.04	.02	.02	.06	.17
Very inadequate	.03	.00	.01	.03	.17
	1.00	1.00	1.00	1.00	1.00
Percent of sample	100%	19%	41%	33%	7%
n	1695	324	689	560	122

Overall, 70% of the survey respondents reported that the quality of education was excellent (18%) or good (52%), but the distribution of students' responses to the question about the quality of education was very different for students reporting high or low intellectual growth. For example, 19% of the students in the sample reported very large intellectual growth, and those students were very satisfied with the quality of education: 91% of them reported an excellent (46%) or good (45%) quality of education. In contrast, only 30% of the students reporting low or no intellectual growth rated the quality of education good or excellent. The decision-tree algorithm detected no significant difference between students reporting low growth and no growth and so grouped students in these two categories together.

Identifying perceived intellectual growth as a principal determinant of academic satisfaction is consistent with the regression results. This finding is also consistent with previous studies linking perceived learning and satisfaction (Pike 1993 citing several sources). It is indirectly consistent with research identifying academic achievement measured by GPA as the most important predictor of academic satisfaction (Aitken 1982, Knox *et al.* 1992). However, other research calls this causality into question, finding satisfaction to be a stronger predictor of GPA than GPA is of satisfaction (Bean & Bradley 1986, Pike 1991); suggesting a spurious relationship between satisfaction and learning (Pike 1993), or failing to find a significant relationship between GPA and satisfaction (Pate 1993). Decision-tree analysis does not test for causality, but it is noteworthy that self-reported GPA does not appear as the predictive variable in this analysis although it is in the data set. Students' perceptions of growth are more important.

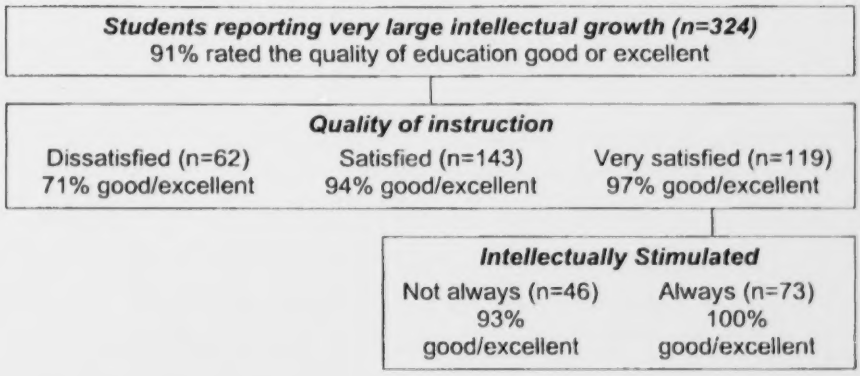
The categorical perspective of decision-tree analysis suggests policy implications not as evident in a regression model. The differences shown in Table 2 reveal a significant dimension of diversity among the undergraduates in a public research university: if the sample accurately represents the population, about 20%—those reporting very large intellectual growth—are model undergraduates and highly satisfied; 40% are quite academically engaged and satisfied, and 40% are less so. Previous studies of satisfaction have disaggregated students demographically (for example Sanders & Burton 1996), but disaggregating them on the dimension that most distinguishes their satisfaction offers an alternative basis for program planning.

Lower branches of the decision tree further demonstrate the value of the categorical analysis by identifying different satisfaction predictors for different types of students. It seems unlikely that very different kinds of students, for example those experiencing very high intellectual growth and those experiencing none, are influenced by the same aspects of the

college experience, but these differences have not been widely studied. Pascarella & Terenzini (1979) highlighted heterogeneous effects when they investigated interactions between student characteristics and measures of social and academic integration. Later they called attention to the importance of studying variation in the effects of college experiences (Terenzini & Pascarella 1991). Conditional effects on satisfaction have not been extensively studied, however, with the exception of research showing gender differences in the correlates of satisfaction (Bean & Bradley 1986, Benjamin & Hollings 1997) and Borden's (1995) market segmentation study.

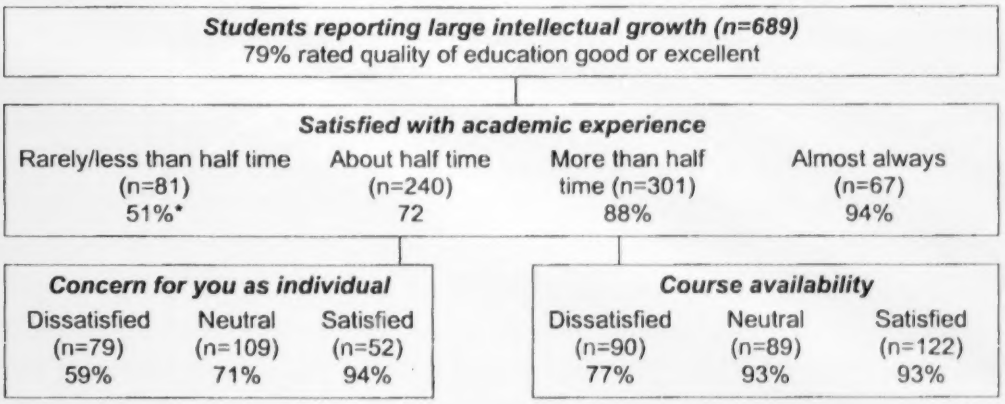
Table 4 identifies variables that differentiate the satisfaction of the 324 students who reported very high intellectual growth by summarizing for other independent variables the type of frequency distribution shown in Table 3. The percentage shown in each node is the percent of students in that group who rated the quality of education excellent or good. For example, among the 119 students reporting very large intellectual growth who were also very satisfied with the quality of instruction, 97% believed the quality of education was good or excellent, compared to only 71% of the 62 students dissatisfied with the quality of instruction. Moving further down the tree, 100% of the high-growth students very satisfied with the quality of instruction who were also consistently intellectually stimulated reported that the quality of education was either good or excellent. There were no significant associations among the students less satisfied with the quality of instruction so these "limbs" do not branch further, given the restriction specified in the analysis that parent nodes have a minimum of 75 observations, and child nodes a minimum of 40 observations.

Table 4. Satisfaction with Quality of Education:
Students with Very High Intellectual Growth



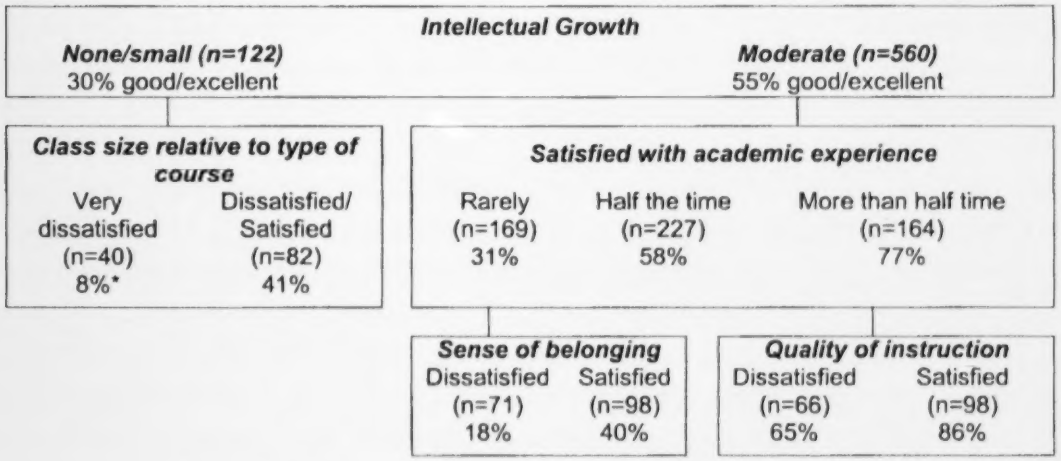
The rest of the decision tree is displayed in Table 5, which shows the branches for students who reported large (but not very large) intellectual growth (41% of the sample), and Table 6 which shows the students who reported low or moderate intellectual growth (40% of the sample). As in Table 4, the percentages shown are the percent of students in each cell who rated the quality of education excellent or good. Not only academic factors, but also social and service variables are predictors of the satisfaction of these students with the quality of education. Perceptions that there is "concern for you as an individual" on the campus and satisfaction with course availability are associated with the relative satisfaction of students experiencing large intellectual growth. A sense of belonging and class size are important to students perceiving moderate growth or less.

Table 5. Satisfaction with the Quality of Education:
Students with Large Intellectual Growth


Students reporting large intellectual growth (n=689)
79% rated quality of education good or excellent
Satisfied with academic experience
Rarely/less than half time (n=81) 51%*
About half time (n=240) 72
More than half time (n=301) 88%
Almost always (n=67) 94%
Concern for you as individual
Dissatisfied (n=79) 59%
Neutral (n=109) 71%
Satisfied (n=52) 94%
Course availability
Dissatisfied (n=90) 77%
Neutral (n=89) 93%
Satisfied (n=122) 93%

* Percent of students rating the quality of education excellent or good.

Table 6. Satisfaction with Quality of Education:
Students with Low or Moderate Intellectual Growth



* Percent of students rating the quality of education excellent or good.

Tables 4-6 show how different experiences affect the educational satisfaction of students with different perceptions of intellectual growth: indications of social integration such as "concern for you as an individual" and "sense of belonging" are important to less academically-engaged students. While most of the variables that emerge as important in the decision-tree analysis were also identified as important by the regressions, the decision tree clarifies their

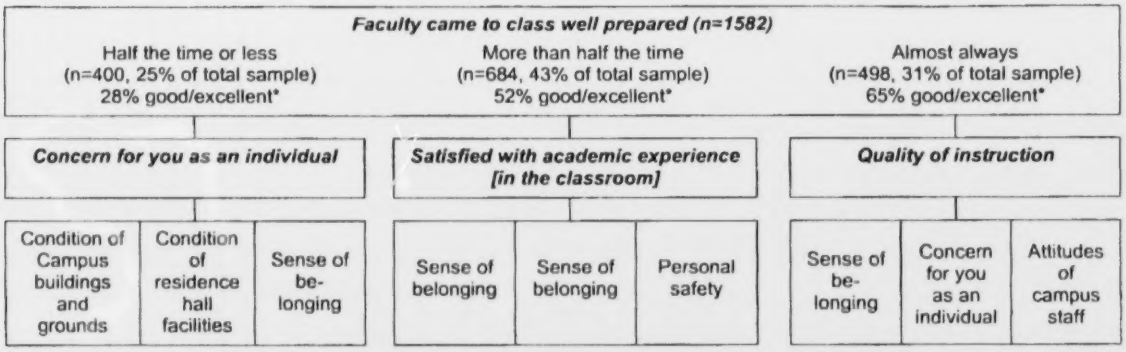
significance by locating these conditional effects. They support a view of satisfaction parallel to Tinto's (1975) suggestion with respect to retention that the effects of social integration may compensate for weak academic integration.

Without displaying the tree structure, it is also worth noting that a different pattern distinguishes freshmen who are satisfied with the quality of their education, an important difference given the importance of students' first-year experience. Satisfaction with "preparation for a career" is the most important differentiating variable, perhaps reflecting the limited opportunity freshmen have had to grow intellectually or to recognize intellectual growth. More generally, self-reported intellectual growth increases with class level.

SATISFACTION WITH "THIS COLLEGE IN GENERAL"

Academic variables again emerge as most important in the decision-tree analysis of satisfaction with "this college in general," as shown in the abbreviated tree diagram in Table 7. It is how frequently students report having had "faculty who came to class well prepared" that most distinguishes their satisfaction, a variable that did not emerge as important in the regression analysis.

Table 7. Satisfaction with This College in General


Faculty came to class well prepared (n=1582)
Half the time or less (n=400, 25% of total sample) 28% good/excellent*
More than half the time (n=684, 43% of total sample) 52% good/excellent*
Almost always (n=498, 31% of total sample) 65% good/excellent*
Concern for you as an individual
Satisfied with academic experience [in the classroom]
Quality of instruction
Condition of Campus buildings and grounds
Condition of residence hall facilities
Sense of be-longing
Sense of belonging
Sense of belonging
Personal safety
Sense of be-longing
Concern for you as an individual
Attitudes of campus staff

* Percent of students reporting they were satisfied or very satisfied with this college in general.

At each node on this abbreviated tree diagram the student groups to the right are more satisfied than those to the left. For example, perceptions of the "quality of instruction" differentiate the satisfaction of students who reported that faculty almost always came to class prepared, and "attitudes of campus staff" differentiated the satisfaction of the students most satisfied with the quality of instruction.

Identifying faculty-preparedness as a principal determinant of student satisfaction demonstrates the power of data mining. "Faculty came to class well prepared" is an ambiguous student opinion item, because students' responses are as likely to reflect differences in their ability to understand and absorb course material as differences in faculty performance. With its validity open to question and its focus on a very specific academic experience, this variable might not be selected for investigation in hypothesis-driven research on general satisfaction. Faculty preparedness is, however, a well-known determinant of student achievement, so mining the data reveals a relationship of considerable theoretical interest.

A recent literature review identifies "teacher organization and preparation" as one of two dimensions of teacher behavior consistently related to student achievement (Pascarella, Edison, Nora, Hagedorn & Braxton 1996 citing Cohen 1981, Feldman 1989, and Feldman 1994). The

identification of teacher preparedness as a principal determinant of student satisfaction therefore raises an important causal question: Are students satisfied because they perceive academic achievement, or are achievement and satisfaction separate results of good teaching? Whatever the relationship, identifying this key academic variable as a determinant of student satisfaction strongly supports the conclusion emerging in this analysis. Viewing students as consumers is a fruitful perspective, but it should not lose sight of what they are consuming. Teaching is the principal product of higher education, and teaching and learning appear to have more effect on students' general satisfaction than the campus services and amenities on which uncritical consumerism might focus attention.

The importance of faculty-preparedness also focuses attention squarely on student-faculty interaction in the classroom. The effect of out-of-classroom student/faculty interaction has received considerable attention (Endo & Harpel 1982, Pascarella 1980, Terenzini & Pascarella 1980), but at least one study comparing the effects of different dimensions of student/faculty relationships found that "stimulating coursework and good teaching were somewhat more important [to seniors' overall evaluations of their academic programs] than opportunities for faculty/student interaction or perceived faculty knowledgeability" (Hearn 1985, 413). The student-opinion survey includes items such as satisfaction with the "out-of-class availability of your instructors," but at least on the campus where the data were collected they do not emerge as principal determinants of satisfaction.

The analysis of satisfaction with "this college in general" also supports the hypothesis that non-academic elements of the college experience are more important to less academically engaged students. The satisfaction of students who perceived the faculty as "almost always well prepared" were most differentiated by their perceptions of the quality of instruction. Those in

the middle group, who perceived the faculty as generally well prepared, were further differentiated by satisfaction with their academic experience, an academic indicator but less specific than the quality of instruction. The students least satisfied with the faculty are further distinguished by a non-academic variable, satisfaction with "concern for you as an individual." The nodes on this branch for students feeling there is little concern are the only ones on which satisfaction with campus facilities appears. These students appear to be so disengaged from the academic and social life of the campus that their satisfaction is differentiated by perceptions of its physical characteristics.

CONCLUSION

Comparisons of students' experiences at a single campus provide several insights into student satisfaction. The generalizability of these conclusions needs to be tested, and comparisons of students on different campuses could yield very different results. Nonetheless studying a single student body begins to identify aspects of the college experience that most affect student satisfaction. Within this population,

- Students' general satisfaction, satisfaction with the quality of education, and likelihood of returning to the same college, measure satisfaction with different aspects of the college experience.
- Academic experiences most differentiate students who are more satisfied with college from those less satisfied, though a sense of belonging also contributes significantly to satisfaction. Satisfaction is strongly related to students' reaction to faculty in the classroom.
- The undergraduate population of a public research university is differentiated by varying perceptions of intellectual growth, and different types of experience further differentiate the satisfaction of students with different experiences of growth.

- Non-academic aspects of college are more important to students who are less academically engaged than they are to those more engaged.
- Academic diversity is a more important explanation of satisfaction differences than demographic diversity. No demographic variable emerged as a significant predictor.
- Student satisfaction is significantly influenced by pre-college attitudes and as well as campus experiences. It reflects inputs as well as measuring college outcomes.
- Different perceptions of campus facilities and services have relatively little effect on the varying satisfaction of students on a single campus.
- Satisfaction does not appear to have an important effect on students' decision to transfer, though the data available from this study cannot offer adequate evidence for or against this conclusion.
- Freshman satisfaction is most differentiated by perceptions of career preparation, suggesting that faculty teaching first-year courses should help students understand how they constitute a step toward students' career goals.
- The importance of programs that promote the social integration of freshmen is also suggested by these results, since intellectual growth increases with class standing and a sense of belonging is more important to the satisfaction of less intellectually-engaged students.

Faculty and administrators can examine student satisfaction in various ways. They can focus on improving the specific aspects of students' experience with which students are least satisfied. If comparative data are available, they can address items on which the college is most different from its peers. Or, as in this project, they can identify those aspects of a college experience that most differentiate their own students' general satisfaction. Each of these approaches has limitations. How useful is it to know that the food service is rated low if all

students dislike institutional food? How important is it to know that the campus bookstore is rated worse than others if that has little effect on students' overall college experience? And how important is it to know that differing perceptions of campus facilities do not affect satisfaction within the a particular student body, when all the students might be more satisfied in a more commodious setting? Despite these limitations, each approach can contribute to understanding student satisfaction by focusing attention on selected elements of the college experience that could be addressed in program development.

Intracampus comparative analysis also supports academic planning by profiling the student body as a non-homogenous population, differentiated not by demographics but by intellectual experiences. Specifically, this analysis suggests the importance of developing programs and structures that integrate into campus life students who are relatively disengaged academically, since social integration appears relatively important to them. Honors colleges are undoubtedly exciting places for top students, but structures such as learning communities that promote social integration may have a greater effect on the satisfaction of less high-achieving students.

Regressions alone would not lead to these conclusions. Decision-tree analysis contributes a different perspective by identifying different predictive variables and differences within the student body that shed new light on the heterogeneity of college students. The diversity of college students and college-student expectations is an important motivation for student satisfaction studies (Borden 1995, Sanders and Chan 1996). The results of this study indicate the importance of heterogeneous academic experiences as an important dimension of that diversity.

The validity and utility in studies of student experience of data mining generally and decision-tree analysis using CHAID specifically can only be proven by further use, but they merit further exploration as an alternative and complement to other statistical methods for drawing policy-relevant conclusions from many-variable surveys. In this study, the hypothesis-free data-mining approach and the disaggregated findings of decision-tree analysis focus attention on elements of students' experience worthy of campus discussion and further research.

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